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(21) International Application Number: PCT/IB98/00893 (22) International Filing Date: 9 June 1998 (09.06.98) (30) Priority Data: 9702213-1 10 June 1997 (10.06.97) SE 9704634-6 12 December 1997 (12.12.97) SE 9800268-6 30 January 1998 (30.01.98) SE (71)(72) Applicant and Inventor: LILJERYD, Lars, Gustaf (SE/SE); Vintervagen 19, S-171 34 Solna (SE). (72) Inventors; and (75) Inventors/Applicants (for US only): EKSTRAND, Per, Rune, Albin (SE/SE); Renstiernas Gata 29, S-116 31 Stockholm (SE). HENN, Lars, Fredrik (CH/SE); Ritarvagen 14, S-168 31 Bromma (SE). KJÖRLING, Hans, Magnus, Kristofer (SE/SE); Vindhemsgatan 19C, S-752 27 Uppsala (SE). (74) Common Representative: LILJERYD, Lars, Gustaf; Vinter- vagen 19, S-171 34 Solna (SE).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. (88) Date of publication of the international search report: 10 February 2000 (10.02.00)	
(54) Title: SOURCE CODING ENHANCEMENT USING SPECTRAL-BAND REPLICATION			
(57) Abstract The present invention proposes a new method and apparatus for the enhancement of source coding systems. The invention employs bandwidth reduction (101) prior to or in the encoder (103), followed by spectral-band replication (105) at the decoder (107). This is accomplished by the use of new transposition methods, in combination with spectral envelope adjustments. Reduced bitrate at a given perceptual quality or an improved perceptual quality at a given bitrate is offered. The invention is preferably integrated in a hardware or software codec, but can also be implemented as a separate processor in combination with a codec. The invention offers substantial improvements practically independent of codec type and technological progress.			

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INTERNATIONAL SEARCH REPORT

International Application No.

/IB 98/00893

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04B1/66

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 127 054 A (HONG DAEHYOUNG ET AL) 30 June 1992 cited in the application see figure FIGURE see column 1, line 41 - line 50 see column 1, line 65 - column 2, line 2 see column 2, line 11 - column 3, line 33 ---	1-4,9, 11,24, 26,28
X A	US 4 667 340 A (ARJMAND MASUD ET AL) 19 May 1987 see abstract; figures 4,6 see column 3, line 8 - line 43 see column 7, line 48 - column 8, line 22 --- -/-	1-4,24, 26 11-14

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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Date of the actual completion of the international search

26 April 1999

Date of mailing of the international search report

21 12 1999

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INTERNATIONAL SEARCH REPORT

International Application No

F /IB 98/00893

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 068 899 A (ELLIS JOHN G ET AL) 26 November 1991 see abstract; figures 1-7 see column 1, line 39 - line 52 see column 2, line 1 - line 36 see column 2, line 64 - column 3, line 5 see column 5, line 62 - column 6, line 14 ---	1-4,6, 24,26
A	A J S FERREIRA: "Audio Spectral Coder" AES REPRINT 4201, 100TH CONVENTION, COPENHAGEN, 11 - 14 May 1996, XP002100534 cited in the application see figure 3 see page 5, paragraph 4.2; figures 2,4,5 see page 7, paragraph 5; figure 4 -----	1-4,7, 17,24, 26,30

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Form PCT/ISA/210 (continuation of second sheet) (July 1992)

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 98/00893

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-20, 24-30

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-20,24-30

Enhancement of a source coding system comprising an encoder discarding frequency bands, a decoder performing a transposition of frequency bands from a 1st signal to a 2nd signal and a combiner to generate an output signal from 1st and 2nd signal

2. Claims: 21-23,31,32

Method and apparatus for computationally efficient transposition by expanding or compressing a time signal

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/IB 98/00893

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5127054	A	30-06-1992	NONE	
US 4667340	A	19-05-1987	EP 0124728 A	14-11-1984
			JP 1807228 C	10-12-1993
			JP 5016599 B	04-03-1993
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US 5068899	A	26-11-1991	CA 1220282 A	07-04-1987